

REMARKS

Claims 1-3, 5-17, 19, 21 and 22 are pending in the application. Claims 1-3, 5-17 and 19 stand rejected. Claims 21 and 22 are newly added. It is believed that the remarks laid out herein below address each of the Examiner's rejections of the claims. When used below, numbers in titles indicate remarks corresponding to the numbered paragraphs of the Office Action mailed 30 January 2004.

1. Response to Remarks

2 - 3. Claim Rejections – 35 USC § 102(e)

Claims 9, 10, 12 and 14 are rejected under 35 USC 102(e) as being allegedly anticipated by U.S. Patent No. 6,519,221 ("Manalis"). Respectfully, applicant disagrees and traverses the rejection.

To anticipate a claim, Manalis must teach every element of the claim and "the identical invention must be shown in as complete detail as contained in the ... claim." MPEP 2131 citing *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 2 USPQ2d 1051 (Fed. Cir. 1987) and *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 9 USPQ2d 1913 (Fed. Cir. 1989). Applicant respectfully submits that many differences exist in the claimed elements between Manalis and applicant's claimed invention such that Manalis cannot be said to anticipate applicant's invention. More specifically, Manalis does not teach every element of applicant's claims 9, 10, 12 and 14, as demonstrated herein below.

Claim 9: The Examiner states that Manalis teaches "an energy-emitting tip 115". Respectfully, applicant disagrees. Manalis teaches a tip for "application of a **voltage**" (col. 3, line 8-9, emphasis added). As is known in the art, voltage is a quantitative expression of **potential energy**. In other words, voltage expresses the **potential difference** or **electrical potential between two points** in an electrical field.

Applicant submits that **a tip for applying a voltage** is therefore different from an energy-emitting tip. As supported by the specification, applicant's energy-emitting tip "typically emits an electron beam but can also emit a thermal beam, a light beam or any other type of energy beam..." (page 12, lines 11-12). Applicant contends that a tip for **applying** a voltage does not emit -- "give or send out (matter or energy)" (The American Heritage® Dictionary of the English Language: Fourth Edition, 2000), for example because voltage requires two points in an electrical field (i.e., two differently-charged objects with "volts" being measured on the electrical flux lines therebetween).

In addition, applicant respectfully notes that the emission of energy (such as a thermal, light, electron or other energy beam) is not dependent upon an electrical field between differently-charged objects. Furthermore, "emission" suggests a more continuous process than application of a voltage. Manalis's tip for application of a voltage is therefore different from applicant's energy-emitting tip, thus Manalis fails to teach or suggest every element of claim 9.

Claim 10: Claim 10 depends from claim 9 and therefore benefits from the above arguments. As such, applicant includes herein by reference each and every statement made above. In addition, applicant submits that the Examiner's statement that Manalis's tip "emits electrons to oxidize the medium's surface", is inaccurate and an inference beyond the teachings of Manalis. Respectfully, applicant is unable to find the term "emit" or any of its common synonyms, "discharge," "beam," "emanate," "expel," "give off," or "radiate," despite the technical assistance of a computer to word-search the text of Manalis.

Further, as is known in the art, oxidation occurs when atoms in an element **lose** electrons. **Emitting** electrons from a tip (*not the surface*) would not oxidize a medium's surface, but would likely reduce the surface, therefore thwarting Manalis's aim of "writ[ing] bits onto a metal substrate by oxidizing the surface"(see Abstract), and rendering Manalis inoperable. Manalis therefore cannot and does not teach an energy-emitting tip that emits electrons. Thus, Manalis fails to anticipate claim 10.

Claim 12: Claim 12 also depends from claim 9 and benefits from like arguments. As such, applicant includes herein by reference each and every statement made above. Applicant submits that claim 12 is further allowable over Manalis for at least the reason that Manalis does not teach a data storage device "wherein each of the molecules comprises a one-dimensional conductor molecule." Applicant notes, in the "Response to Remarks" section of the present Office Action, the Examiner's assertion that "Manalis's thin layer of fluid contains molecules and these molecules are immersed in a fluid medium/layer". Applicant respectfully disagrees, pointing out that the term "molecule" is altogether absent from Manalis, as is "one-dimensional conductor molecule". Furthermore, Manalis does not teach the *immersion* of anything in his thin layer of fluid.

Applicant further submits that the Examiner is mistaken in stating that in Manalis, "as in claim 12, each of the molecules comprises a one-dimensional conductor molecule (the molecules are arranged in a line)"(see item 3(g)). Here, the Examiner appears to be reading into Manalis material not present in Manalis for the sole purpose of equating Manalis to applicant's claim 12. Respectfully, applicant is unable to find, and Examiner has failed to identify any clear teaching whatsoever of molecules arranged in a line in Manalis. Respectfully, if Examiner desires to persist in this view, applicant requests Examiners assistance in

identifying any passage within Manalis discussing or describing "molecules are arranged in a line."

Finally, were the Examiner able to indicate an instance of "molecules arranged in a line", applicant points out that "molecules arranged in a line" are not the same thing as one-dimensional molecules. Again, the Examiner appears to be reading into Manalis to render claim 12. For example, one-dimensional molecules may exist outside of a line of molecules; likewise, two-dimensional and three dimensional molecules (i.e. alpha-helices and globular proteins) might also be arranged in a line of sorts, without being a one-dimensional molecule. There is no recitation whatsoever in Manalis of molecules, one-dimensional molecules or molecules arranged in a line.

For at least the reasons argued above, applicant contends that Manalis does not anticipate claim 12.

Claim 14: Claim 14 also depends from claim 9 and benefits from like arguments. As such, applicant includes herein by reference each and every statement made above. Furthermore, Manalis does not teach or suggest conductive molecules attached to the storage medium.

The Examiner writes of the water layer on Manalis's substrate: "as in claim 14, the molecules comprise conductive molecules (Fig. 2; column 3, lines 8-12; water is conductive)." Respectfully, applicant disagrees. Water itself is non-conductive unless it contains dissolved ions to transport electric charge. Fig. 2 does not show conductive molecules, nor is there any indication of conductive molecules dissolved within the "layer of water adsorbed on the surface" of substrate S (col. 3, line 11). As previously stated, Manalis fails to mention molecules at all. Manalis therefore fails to anticipate the conductive molecules of claim 14.

For the reasons argued above, among other reasons not specifically laid out herein, applicant contends that Manalis fails to anticipate the above claims. Withdrawal of the Examiner's rejection and allowance of each of claims 9, 10, 12 and 14 is respectfully requested.

4 - 5. Claim Rejections – 35 USC § 103(a)

For the purpose of the following discussion, the Examiner is respectfully reminded of the basic considerations which apply to obviousness rejections.

When applying 35 U.S.C. §103, the following tenets of patent law must be adhered to:

(A) The claimed invention must be considered as a whole;

(B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;

(C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and

(D) Reasonable expectation of success is the standard with which obviousness is determined. MPEP §2141.01, *Hodosh v. Block Drug Co., Inc.*, 786 F.2d 1136, 1134 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

In addition, it is respectfully noted that to substantiate a *prima facie* case of obviousness the initial burden rests with the Examiner who must fulfill three requirements. More specifically:

To establish a *prima facie* case of obviousness, three basic criteria must be met.

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine reference teachings.

Second, there must be a reasonable expectation of success.

Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The **teaching or suggestion** to make the claimed combination **and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure**. (emphasis and formatting added) MPEP § 2143, *In re vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)

6. The Examiner has rejected Claims 1, 2, 7 and 8 as being allegedly unpatentable over Manalis in view of U.S. Patent No. 5,479,024 ("Hillner"). Applicant respectfully disagrees and traverses the rejection. Applicant includes herein by reference each and every statement made above, in addition these claims are also patentable for the following additional reasons.

Paralleling the MPEP references cited above, the Federal Circuit has enunciated several guidelines in making a §103 obviousness determination. A *prima facie* case of obviousness is established when and only **when the teachings from the prior art itself** would appear to have **suggested** the claimed subject matter to a person of ordinary skill in the art. *In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051 (C.C.P.A. 1976)). (Emphasis added). "The mere fact that the prior art **may** be modified in the manner suggested by the Examiner does **not** make the modification obvious unless the prior art suggested the desirability of the modification." (emphasis added) *In re Fritch*, 23 USPQ 2d 1780, 1783-84 (Fed. Cir. 1992).

Claim 1: There is no suggestion or motivation to modify Manalis or Hillner or to combine their teachings. Hillner teaches near-field microscopy, not a data storage device. The

Examiner argues "a data/image system using a scanning probe...requires its data/image be enhanced during the scanning operation." However, this appears speculative, as this assertion is not proven or supported by the Examiner. Manalis in view of Hillner thus fails to meet the first criterion for establishing a *prima facie* case of obviousness.

Manalis in view of Hillner also fails to teach or suggest all the limitations of claim 1. As noted by the Examiner, Manalis fails to teach a ferrofluid. As Hillner makes no reference to "storage," it is unclear as to how or why the mere use of a ferrofluid in microscopy would spontaneously suggest or imply the use of a ferrofluid in data storage.

As argued above, applicant submits that Manalis also fails to teach an energy-emitting tip. Furthermore, and contrary to the Examiner's assertion, Manalis does not teach "particles contained in the fluid medium (Fig. 1; fluid is particles/molecules in a liquid form)." Fig. 1 shows neither fluid nor particles/molecules. There is, likewise, no mention of "particles" within Manalis.

"If the proposed modification or combination of prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render the claims *prima facie* obvious." *In re Ratti* 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Manalis makes no assertion of emission or the use of a ferrofluid and Hillner makes no assertion of storage of any form let alone that the use of a ferrofluid can or should be considered in a data storage device.

The Examiner has already construed molecules in Manalis, writing: "Manalis's thin layer of fluid contains molecules and these molecules are immersed in a fluid medium/layer". The Examiner now appears to render a rejection by drawing a parallel between the molecules construed in Manalis and the particles of claim 1. This constitutes an improper rejection.

First, there is no mention of "particles" within Manalis. Second, molecules and particles are not the same thing, a molecule being definable as a very small particle, or "The ***smallest particle*** of a substance that retains the chemical and physical properties of the substance and is composed of two or more atoms; a group of like or different atoms held together by chemical forces" (*The American Heritage® Dictionary of the English Language, 4th Ed., 2000*). This suggests that a molecule may be a particle, but not vice-versa.

Separate and apart from a difference in definition, the differences in form, function and purpose of a liquid can not be ignored. Applying Examiner's statements to other fluids, Examiner appears to contend that a soda-pop and liquid concrete can and should be construed as substantially identical and functionally interchangeable as both may contain water and particulate substances. The fluid of Manalis is not akin to the fluid medium set forth by

applicant, and no teaching or suggestion is expressed or implied in Manalis or Hillner that it is or should be.

The Examiner writes: "Hillner teaches a nanometer-scale/near-field data storage having a ferrofluid as a conducting layer". Applicant respectfully disagrees. Hillner teaches a "near-field optical microscope and method of microscopy" (Abstract), not a data storage device.

Further, Hillner also fails to teach the claim limitation of a fluid medium positioned between the energy-emitting tip and the storage medium wherein the fluid medium comprises a ferrofluid. Rather, Hillner specifically teaches that "the surface of the sample 15 is coated with a layer 8 of fluorescence quenching material such as, for example, a liquid or gel doped with conducting particles, such as a ferro-fluid. The layer 8 is **locally displaced by a nonconducting element located at the tip portion of cantilever 3** to permit fluorescence in a small region in close proximity to the tip of the probe" (col. 9, lines 15-22, emphasis added). Hillner's ferrofluid cannot therefore be between an energy emitting tip and the storage medium because it is locally displaced to permit fluorescence in the area to be studied. Furthermore, **Hillner does not teach an energy emitting tip**, and it is quite likely that the integration of an energy emitting tip would undermine the operation of Hillner.

Hillner teaches a probe with an optically active element attached to the probe tip for **quenching** light energy. As explained,

"electromagnetic energy imparted to portion 21 will be **absorbed** by the optically active element which is slightly heated in the process, thereby **quenching** the energy of portion 21 and preventing fluorescent light from being further emitted therefrom." (col. 6, lines 40-44).

As is known in the art, quenching energy and emitting energy are not the same. Given the uniqueness of each behavior it is not reasonable to assume that a device may do both unless explicitly stated. It is therefore clear that an energy-emitting tip is missing in the combination of Hillner and Manalis, providing a further reason why the references fail to establish a *prima facie* case of obviousness. Furthermore, applicant submits that Hillner is unavailable as a reference for rejection of applicant's claims.

The following is a quotation from the MPEP regarding obviousness-type rejections under 35 U.S.C. 103:

"In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned" *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992)."

Hillner is neither in the field of applicant's endeavor, nor reasonably pertinent to the problem with which the present application ("the '008 application") is concerned. Hillner, teaching "a **near-field optical microscope** and **method of microscopy** in which a probe including a flexible cantilever having a sharp tip is positioned in proximity to a sample" (Abstract, emphasis added), is both structurally and functionally different from the embodiments of the '008 application

Claim 2: Claim 2 depends from claim 1 and thus benefits from like arguments. Applicant includes herein by reference each and every statement made above. Furthermore, applicant disagrees with the Examiner's writing that in Manalis: "the energy-emitting tip emits electrons (Fig. 1; AFM where its tip emits electrons to oxidize the medium's surface)." As discussed above, Manalis does not teach an energy emitting tip, reciting instead a tip to which "negative bias is applied" where data is to be written by application of a voltage (col. 3, lines 8-15). Manalis also fails to recite electron emission, and understandably so, as emission of electrons would thwart Manalis's aim of "writ[ing] bits onto a metal substrate by **oxidizing** the surface"(Abstract). Oxidation results from a loss of electrons, not a gain. Emitting electrons from Manalis's tip would thus more likely **reduce** the medium's surface.

Hillner also fails to teach an energy emitting tip emitting electrons. Applicant thus submits that claim 2 is patentable over Manalis in view of Hillner.

Claim 7: Claim 7 depends from claim 1 and benefits from the arguments presented above. Applicant includes herein by reference each and every statement made above. The cited references therefore do not render claim 7 *prima facie* obvious.

Claim 8: Claim 8 also depends from claim 1 and benefits from like arguments. As such, applicant includes herein by reference each and every statement made above.. Claim 8 also recites "...the particles form a **bridge** between the tip and the storage medium. " The Examiner attempts to recreate the bridge in Manalis, writing that in Manalis, "...fluid is an **interface** between the tip and the medium"(emphasis added). Applicant respectfully disagrees, for at least the following reasons:

First, Manalis recites neither a bridge nor the fluid interface described by the Examiner; rather, Manalis recites an "Interface Module 155", operable to send "commands to controller 105, **causing tip 115 to be brought adjacent a desired point** on substrate S"(col. 4, lines 26-28). **Bringing** something **to** something is quite different from **bridging** something **to** something. The Manalis interface module is quite different from a bridge.

Second, an interface in general (and as described by the Examiner) is also different from a bridge. A bridge is definable as, "a structure **spanning and providing passage over** a

gap or barrier" or "an intramolecular connection that **spans** atoms or groups of atoms", suggesting aiding movement beyond and/or over a boundary. An interface, in contrast, is definable as "a surface **forming a common boundary** between adjacent regions, substances, or phases" (*The American Heritage® Dictionary of the English Language, 4th Ed., 2000, emphasis added*), suggesting that the regions, substances or phases may not span or pass over into one another. A bridge is a different structure than an interface, and one that is not taught or suggested in the cited references.

Applicant respectfully points out, per MPEP § 2141, "[t]he references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention." Applicant believes that the "obviousness" to modify Manalis in view of Hillner is a mere *ipse dixit* of the Examiner, in hindsight, having the benefit of applicant's teachings. Applicant respectfully submits that the Examiner has not made a prima facie case of obviousness for the elements of this claim. For at least these reasons, applicant contends that claims 1, 2, 7 and 8 are patentable and Examiner's rejection of these claims should be withdrawn.

7. The Examiner has rejected Claims 15, 16, 17 and 19 as being allegedly unpatentable over Manalis in view of U.S. Patent No. 5,479,024 ("Hillner"). Applicant respectfully disagrees and traverses the rejection. Applicant includes herein by reference each and every statement made above. In addition these claims are also patentable for the following additional reasons.

The Examiner's reasons for rejection are laid out according to the applicable claims, below.

Claim 15: The Examiner states that Manalis teaches the following elements:

- (a) as in claim 15, providing a storage medium comprising nanometer-scale data storage area (Fig. 1);
- (b) as in claim 15, positioning an energy-emitting tip 115 in close proximity to the storage medium (Figs. 1 and 2);
- (c) as in claim 15, guiding energy emitted from the energy-emitting tip to the storage area (Fig. 1);
- (d) as in claim 15, the guiding step comprises channeling the energy emitted through particle in a fluid medium between the storage medium and the energy-emitting tip (Fig. 1; column 2, lines 42 and 43);
- (e) as in claim 15, altering a state of the storage areas with the emitted, guided step (Fig. 1; energy emitted from the tip 115 induces oxidation on the surface of the storage medium).

Applicant respectfully disagrees. As previously submitted, Manalis does not teach an energy-emitting tip, and therefore does not teach elements (b)–(e), above. In addition, Manalis fails to teach particles, and therefore cannot teach a second aspect of element (d).

Manalis makes no mention of guiding energy or channeling energy, instead teaching the application of a voltage to a substrate. As noted above, a potential energy is not the same as an emitted energy. Thus, Manalis fails to teach third and fourth aspects of element (d), and at least a second aspect of element (e).

Furthermore, and as noted by the Examiner, Manalis does not teach a ferrofluid. Although Hillner recites a ferrofluid, applicant disagrees with the Examiner's idea that, "it would have been obvious to one of ordinary skill in the art to use a conductive layer such as a ferrofluid layer similar to Hillner's...because the conductive ferrofluid immerses the scanned surface so that a low voltage electrical path instead of noisy high voltage can be applied to Manalis's energy emitting tip for improving the scanning sensitivity."

This is an "**obvious to try**" rejection. Such a rejection is improper and has long been criticized and rejected as it is not a sufficiently discriminatory test. See *In re Lindell*, 155 USPQ 521, 523 (C.C.P.A. 1967.) Hillner specifically uses locally displaced ferrofluid to **quench** fluorescence. Applicant submits that it would not have been obvious to use a quenching fluid as a conductor. "**If the proposed modification or combination (such as altering quenching to emitting) of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render the claims prima facie obvious.**" *In re Ratti* 270 F.2d 810, 123 USPQ 349 (CCPA 1959) (comment added). For at least these reasons, applicant contends that claims 1, 2, 7 and 8 are patentable and Examiner's rejection of these claims should be withdrawn.

Claim 16: The Examiner states that Manalis teaches the following regarding claim 16:

(f) the guiding step comprises channeling the energy emitted through molecules positioned between the storage medium and the energy-emitting tip (Fig. 1, column 2, lines 42 and 43; energy emitted from the tip 115 induces oxidation through the fluid layer coated on the surface of the storage medium).

Again, applicant respectfully disagrees and traverses the rejection. Applicant includes herein by reference each and every statement made above.

In addition to benefiting from arguments presented in base claim 15, dependent claim 16 recites the additional limitation of channeling the energy emitted through conductor molecules positioned between the storage medium and the energy-emitting tip. Manalis does not teach this channeling or other channeling.

Claim 17: The Examiner states that Manalis teaches the following regarding claim 17:

- (g) as in claim 17, the fluid medium is conductive (Fig. 2; column 3, lines 8-12; water is conductive);
- (h) as in claim 17, the molecules in the fluid medium comprise one-dimensional molecules (the fluid layer having molecules formed in one-dimension).

Applicant respectfully traverses the rejection, and includes herein by reference each and every statement made above. Claim 17 depends from claims 15 and 16, thus benefiting from the arguments presented above. Additionally, and as also presented above, the Examiner's assertion that Manalis teaches a conductive fluid medium is inaccurate. Water is not inherently conductive, it is the presence of dissolved ions within water that are responsible for conductivity. Manalis does not teach a conductive fluid, molecule or particle between the storage medium and the energy-emitting tip. Manalis also fails to recite a guiding step comprising using conductor molecules wherein each of the conductor molecules comprises one-dimensional conductor molecules, as in claim 17. As presented above (see arguments in support of claim 12), it is inaccurate to assume one-dimensional molecules in Manalis.

Claim 19: Claim 19 also depends from claim 15 and benefits from like arguments. Applicant includes herein by reference each and every statement made above. Additionally, applicant respectfully disagrees with the Examiner's assertion that:

- (i) as in claim 19, the guiding step comprises using particles that form a bridge between the storage medium and the energy-emitting tip (Fig. 1; fluid is an interface between the tip and the medium).

As presented above, Manalis does not teach particles, or a bridge, nor does Manalis recite a fluid interface of the type described by the Examiner. Furthermore, a bridge (recited in claim 19), and an interface (construed by the Examiner). Respectfully repeated for the sake of convenience, Manalis recites neither a bridge nor the fluid interface described by the Examiner; rather, Manalis recites an "Interface Module 155", operable to send "commands to controller 105, **causing tip 115 to be brought adjacent a desired point** on substrate S" (col. 4, lines 26-28). **Bringing** something **to** something is quite different from **bridging** something **to** something. The Manalis interface module is quite different from a bridge.

Second, an interface in general (and as described by the Examiner) is also different from a bridge. A bridge is definable as, "a structure **spanning and providing passage over** a gap or barrier" or "an intramolecular connection that **spans** atoms or groups of atoms", suggesting aiding movement beyond and/or over a boundary. An interface, in contrast, is definable as "a surface **forming a common boundary** between adjacent regions, substances, or phases" (*The American Heritage® Dictionary of the English Language, 4th Ed., 2000, emphasis added*), suggesting that the regions, substances or phases may not span or pass

over into one another. A bridge is a different structure than an interface, and one that is not taught or suggested in the cited references.

For at least the reasons presented herein, applicant submits that claims 15-17 and 19 are patentable over Manalis in view of Hillner. Withdrawal of the Examiner's rejection and allowance of claims 15-17 and 19 is requested.

8. Claims 3 and 11 stand rejected under 35 USC 103(a) as being allegedly unpatentable over Manalis in view of Hillner and U.S. Patent No. 6,084,849, issued to Durig et al. (hereinafter, "Durig"). Respectfully, applicant disagrees and includes herein by reference each and every statement made above.

Claims 3 and 11: As noted by the Examiner, neither Manalis nor Hillner recite a data storage device wherein the energy-emitting tip emits thermal energy (as recited in claims 3 and 11). Durig teaches a storage medium where an emitting tip emits heat energy; however, applicant disagrees with the Examiner's assertion that the combination of Manalis, Hillner and Durig renders claims 3 and 11 obvious. The Examiner writes:

"To cause a *bump* as a data bit on a storage medium by using an AFM, either an electrons [sic] emitting probe such as Manalis's or a heat emitting probe such as Durig's can be used. Hence, for providing energy to the tip of the AFM, it would have been obvious to one of ordinary skill in the art at the time of the invention to choose either electron energy or heat energy, because both electron [sic] and heat are commonly used to make an *indent* on the surface of the storage medium."

Applicant respectfully disagrees with the Examiner's reasoning. First, none of the cited references teach that electron energy or heat energy may be used to form an indent on the surface of the storage medium (see especially arguments in support of claims 2 and 10, above). In fact, only Durig teaches indentation, and then only by "**mechanically** forming an indent in the SMA layer, e.g. by means of a scanning probe tip" (col. 2, lines 30-31).

The Examiner's reasoning that it would have been obvious to choose electron energy or heat energy to form a **bump** because of their purported use for forming **indentations** is not supported by the cited references. Fundamentally a "bump" may be commonly defined as a slight swelling or lump, as a "bump" is convex – rising above or out of the surface. In sharp contrast, an indentation dips below the surface, or moreover is concave. Convex and concave structures are not mutually interchangeable in most situations and it is inappropriate to infer such interchangeability absent a specific statement to that affect. The references simply do not

teach every element of claims 3 and 11, do not demonstrate motivation to combine, and do not demonstrate reasonable expectation of success in their combination.

Claims 3 and 11 depend respectively from claims 1 and 9, and therefore benefit from like arguments. Furthermore, the combination of Manalis, Hillner and Durig lacks motivation. A person using an atomic force microscope to write bits onto a metal substrate (Manalis) would not look to a method and apparatus for performing near field microscopy (Hillner). These references inhabit different patent office classifications, with Manalis assigned to class 369 (Dynamic Information Storage or Retrieval) and Hillner assigned to class 450 (Radiant Energy). The combination of Manalis, Hillner and Durig also lacks reasonable expectation of success. "The mere fact that the prior art *may* be modified in the manner suggested by the Examiner does *not* make the modification obvious unless the prior art suggested the desirability of the modification." (emphasis added) *In re Fritch*, 23 USPQ 2d 1780, 1783-84 (Fed. Cir. 1992).

The Examiner presumably cites Manalis, Hillner and Durig in an effort to render a data storage system with a ferrofluid and a tip that emits thermal energy. However, applicant contends that such a combination would not work.

Durig uses a heated probe tip to remove an indent. There is no indication in Durig that the tip is sufficient to create a bump, much less a bump on Manalis's substrate. Hillner's probe tip 10 with optically active element 13 does not emit thermal energy, rather it is "*slightly heated in the process*" of absorbing electromagnetic energy imparted to portion 21 (col. 6, lines 37-45). Hillner's tip is not heated to *produce* a result, it is heated *as* a result of operations.

Finally, Manalis does not teach using heat at all, and in fact indicates that heat is incompatible with high-density data storage, writing "While devices operating on the atomic or molecular scale surpass this threshold [of a terabit per square inch], they are generally not suited for commercial data storage due to *stringent low-temperature requirements*..." (col. 1, lines 45-48). There is, therefore, no reasonable expectation of success in combining Durig, Manalis and Hillner.

Given the arguments presented above, applicant contends that claims 3 and 11 are patentable over the cited references. Withdrawal of the rejection and allowance of claims 3 and 11 is therefore requested.

9. Claims 5 and 6 stand rejected under 35 USC 103(a) as being allegedly unpatentable over Manalis in view of Hillner and U.S. Patent No. 5,925,818, issued to

Cleveland et al. (hereinafter, "Cleveland"). Respectfully, applicant disagrees and traverses the rejections. Claims 5 and 6 depend from claim 1, and benefit from like arguments. Additional, independent reasons for the patentability of claims 5 and 6 are detailed herein below.

Claim 5: Claim 5 recites a fluid medium comprising a high dielectric fluid. As noted by the Examiner, Manalis and Hillner do not teach a high dielectric fluid/material. Cleveland's note that fluids have dielectric constants does not constitute teaching or suggesting for a high-dielectric fluid. This combination of references is improper as there is nothing to be found in any of the references to suggest or imply applicant's invention. Once again, the mere fact that the references might be combined does not breathe life into an assertion that the combination is obvious.

As per MPEP § 2141, "[t]he references must be viewed without the benefit of impermissible hindsight vision. There is nothing present in any of the three references to suggest this impermissible combination, or that doing so would achieve the invention disclosed by applicant. Respectfully, applicant asserts that there is no suggestion in the improperly combined references of Manalis, Hillner and Cleveland to suggest or imply applicants claimed invention.

For at least these reasons, the Examiner's rejection of claim 5 should now be withdrawn.

Claim 6: Claim 6 recites particles comprising a material chosen from the group consisting of electrically conducting, dielectric and paraelectric materials.

Neither Manalis, Hillner or Cleveland teach paraelectric materials or materials in the paraelectric phase.

Applicant includes herein by reference each and every statement made above. applicant believes that claims 5 and 6 are patentable over the cited references, at least for the reasons detailed herein above. Reconsideration and allowance of claims 5 and 6 is respectfully requested.

10. Claim 13 is rejected under 35 USC 103(a) as being allegedly unpatentable over Manalis in view of Hillner and Cleveland, and further in view of U.S. Patent No. 6,391,217, issued to Schaffer et al. (hereinafter, "Schaffer"). Applicant respectfully disagrees and traverses the rejection, first because claim 13 depends from claims 9 through claim 12 and as such applicant includes herein by reference each and every statement made above. In addition claim 13 is patentable for the following additional reasons.

The Examiner asserts that "Schaeffer teaches an AFM having a liquefied dielectric layer 110 made of a dielectric polymer (Fig. 4b; col. 4, lines 37-48). This is inaccurate. Schaeffer teaches a method for forming a patterned film on a substrate by applying a electric field to the interface between two flowable media on a substrate to produce a structure in the first flowable media, then hardening the structure to form a patterned film. Schaeffer only uses an AFM to provide an **image** of a replication of his silicon master electrode (Fig. 8; col. 10, lines 51-60).

Applicant disagrees with the Examiner's assertion that "it would have been obvious to one of ordinary skill in the art to use Schaeffer's dielectric polymer as Manalis's fluid layer, because the dielectric polymer can be liquefied under an applied electric field". This argument would result in a solid polymer, i.e., Schaeffer's "glassy or semi-crystalline polymer (e.g., polystyrene)" (col. 4, lines 37-40) being placed upon Manalis's substrate S. Manalis specifies a thin layer of **fluid** adsorbed upon substrate S (col. 2, lines 40-43), not a **solid** placed thereupon. Schaeffer's polymer may liquefy under an applied electric field, but in Manalis, a voltage is applied either to a **fluid** layer or, if operating in "tapping mode" (col. 2, line 60-col. 3, line 6), directly to substrate S **without need for the intermediate fluid layer**. In neither case is the voltage applied to an **intermediate solid** with the aim of creating a fluid. It would not, therefore, have been obvious to add an additional dielectric polymer (as in Schaeffer) to Manalis's system, and there is no suggestion or motivation to combine teachings of the two references.

Claim 13 also recites one-dimensional conductor molecules chosen from the group including surfactants. Manalis, Hillner, Cleveland, Schaffer are all silent as to the use of surfactants. The references therefore fail to teach or suggest all elements of claim 13, in addition to failing to provide motivation. Applicant therefore requests withdrawal of the rejection and allowance of claim 13.

NEWLY ADDED CLAIMS

In the Office Action mailed 10/08/2003, the Examiner indicated that claims 4, 7 and 20 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. This statement is not redacted in the present Office Action (mailed 01/30/2004). Therefore, applicant submits herewith new claims 21 and 22, which incorporate elements of previously cancelled claims 7 and 20 and include all the limitations of respective base claims 1, and 15 (through claim 18, which limitations are also included). As such, applicant includes herein by reference each and every statement made above in support of claims 1 and 15.

Applicant respectfully points out that claim 1, as previously amended, contains the limitations of previously cancelled claim 4. Applicant contends that claim 1 is allowable in light of the arguments against Hillner presented herein (see number 6, above) and further in light of the Examiner's previous indication of allowable subject matter in claim 4. Applicant therefore respectfully requests consideration and allowance of new claims 21 and 23.

CONCLUSION


For the reasons given above, and after careful review of all the cited references, applicant respectfully submits that none of the cited references, nor any combination of the cited references, will result in, teach or suggest applicant's claimed invention. But even if any such combination might arguably result in such claimed invention, it is submitted that such combination would be non-obvious and patentable.

In view of the above Amendments and Remarks, applicant has addressed all issues raised in the Office Action dated 30 January 2004, and respectfully solicits a Notice of Allowance for claims 1-3, 5-17, 19 and new claims 21 and 22. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. IN addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Applicant believes that no fees are currently due; however, should any fee be deemed necessary in connection with this Amendment and Response, the Commissioner is authorized to charge deposit account 08-2025, referencing the Attorney docket number 10003492-1.

Respectfully submitted,

By: 
Daniel W. Roberts, Reg. No. 52172
LATHROP & GAGE L.C.
4845 Pearl East Circle, Suite 300
Boulder, CO 80301
Telephone: (720) 931-3016
Facsimile: (720) 931-3001